

Prerequisite Requirements for Entering Genetic Counseling Training Programs

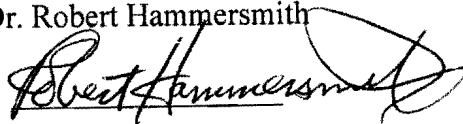
An Honors Thesis (Honors 499)

By

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A handwritten signature in black ink, appearing to read "Robert Hammersmith", written over a horizontal line.

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Introduction

The world today is a place of rapidly increasing technology, and every day there is a new gadget or process that will improve the lives of people on the planet not only immediately but in the future as well. One area of rapid growth in society is the field of genetics. There are more laboratory techniques and equipment, genes, and genetic diseases identified today than could have been imagined in the past. However, with an increase in genetic information, there is also an increase in the demand for knowledgeable and trained scientists, analysts, and technicians. Although most health care professionals are learning about new and serious genetic disorders, they may not have the time to devote or understand the flood of information from these new genetic diseases because there many other illnesses to focus on as well. Many doctors can offer tests for certain genetic diseases, but have no formal training to help a patient or the patient's family deal with the diagnosis. A genetic counselor can provide a patient with options for treatment, genotyping for the client's family, risk assessment (pedigree), as well as provide the information necessary to understand and cope with their disorder.

Genetic Counseling is a rapidly growing field, as it provides an outlet for people to obtain genetic diagnosis and to understand and cope with that diagnosis. As the discipline is growing very rapidly, the programs are also growing. However, these programs are still relatively small, and there are few schools that offer them. A genetic counselor must be certified by the American Board of Genetic Counselors (ABGC) in order to practice in the United States. To do so, that person must graduate from an ABGC accredited school. Currently, there are twenty-nine schools in the United States and three in Canada that are in some form of accreditation (ABGC.net). This is a rapid increase from the first training program that was opened in 1969 (Scott).

The career of genetic counseling provides a valuable service to the community and helps to advance the area of genetics in general. The ABGC defines a genetic counselor as "...a health care professional who is academically and clinically prepared to provide genetic counseling services to individuals and families seeking information about the occurrence, or risk of occurrence, of a genetic condition or birth defect" (ABGC.net). A genetic counselor offers a unique service to a patient that most other health care professionals cannot. Not only can they give a diagnosis based on genetic tests and family history, they also help that patient to understand and cope with that diagnosis and what it may mean for their lives. In order for a genetic counselor to do this, they need a comprehensive training program that allows them to be effective at both aspects of the job, the science and the counseling (mayoclinic.org).

Genetic counselors often work in a comprehensive health care team. They can work in large university medical centers, private hospital, or even in private practice. They deal with many issues that other health care providers do not. For example, most states do not yet recognize them as health care providers, so they cannot be compensated by insurance companies and HMO's. This is a problem for the counselor and the patient who may not be able to afford their services without it (Akin).

Genetic counseling training programs are close at hand for most people that are interested. However, the programs are small and many have specific requirements that must be met in order to enter the program. The comprehensive curriculum can be difficult for someone that does not have the right background. The ABGC recommends graduate course work in:

"human, medical and clinical genetics, psychosocial theory and techniques, social, ethical and legal issues, health-care delivery systems and public health principles, teaching

techniques, research methods, clinical training, working with individuals and families affected with a broad range of genetic conditions” (ABGC.net).

When attempting to enter this field of study or career path, it is difficult to know what is needed in order to start. This is a new field, and schools may not have a pre-genetic counseling program as they would a pre-med or pre-law program. Specific requirements were gathered from the schools in order to make it easier for future students interested in this path.

Methods

In order to discover specific requirements for each program as well as an overall assessment for common necessary requirements, a questionnaire¹ was distributed to all of the programs in the United States and Canada that are accredited with the ABGC. This questionnaire consisted of a survey and an open-ended question and was designed to find all the requirements that a potential applicant should have completed in order to enter a genetic counseling program. These requirements included aspects such as undergraduate classes, undergraduate major, undergraduate GPA, Graduate Record Examination scores, volunteer and advocacy work, counseling experience, and internships and/or job shadowing. The open ended question included with the survey asked, “Please include a written description of any personal attributes and “ideal” applicant should possess”. This question was intended to find information on the personal traits and skills a person should acquire in order to be a genetic counselor. For schools that did not respond to the questionnaire, information was gathered from the individual program websites. These methods were designed to gather all the possible information to provide the most detailed description of the path forward for students and interested parties to succeed in future endeavors as a genetic counselor.

¹ Appendix A

Results

Sixteen schools responded to the questionnaire. This represents 55.17 percent of the schools in the United States and 50 percent of the overall schools in North America. The University of California at Northridge did not respond to the survey and had no requirements listed on their website, so that program will be excluded from the analysis.

The first requirement asked about was the undergraduate classes that should be taken in order to be prepared for a genetic counseling program. 61.29 percent of schools specifically required or recommended general chemistry classes. However, general chemistry must usually be taken in order to take upper level chemistry classes such as organic chemistry. Organic chemistry is recommended and required for these programs as well. 67.74 percent of schools required or recommended it be taken before entry to the program. Biochemistry is another class that is required for most programs; in fact 87.1 percent of programs listed this as a requirement or recommendation.

Biology and genetics courses were required for all programs. General biology was recommended or required by 74.2 percent of programs, but is another class that is often required to take upper level classes. General genetics was required by all but two programs (93.54 percent). Human genetics was only required or recommended by about 38.71 percent of the programs and molecular biology/cell biology was required by about 51.61 percent of the programs.

Psychology or behavioral science classes were also desired prerequisites for many programs. Many did not specifically state general psychology (54.83 percent required), but were more interested in counseling or developmental psychology. However, general psychology is often required as a prerequisite for these classes as well.

Statistics courses are also important courses to take as they are required or recommended by most of the programs (74.19 percent). Some of the programs recommended research methods classes instead of statistics. Taking chemistry, biochemistry, biology, genetics, psychology, and statistics courses as an undergraduate will provide a solid background to prepare a potential candidate for a genetic counseling program².

However, there is more to entering one of these programs than just the classes taken in college. Another question asked was if there was an undergraduate major requirement for entry; most schools said no, but three schools indicated that biological or behavioral sciences were preferred. Fifteen out of sixteen schools that responded to the questionnaire stated that a GPA of 3.0 on a 4.0 scale was the preferred minimum for entry. The schools that did not respond also did not list a minimum on their websites. Graduation Record Examinations or the equivalents are required to enter any graduate program, so it is required for all genetic counseling programs. Many schools indicated that they would not accept students below the 50th or 55th percentile for any section. Virginia Commonwealth University stated that they would not accept a student who's GRE scores were below 1200 (75th percentile). They also stated that they felt the verbal score was more important and rarely accept students that score below 450 (56th percentile) on this section.

Every school required or recommended volunteer or advocacy work. This is true of the schools that responded and those that the requirements were gathered from the program website. Every school also recommended or required having some counseling experience prior to applying. Several schools recommended crisis hotlines or Planned Parenthood as good ways to gather this experience. Job shadowing and internships were also highly recommended by all schools. Only two of the responding schools felt that internships were not necessary, and several

²Appendix B

more stated that internships were recommended, but difficult to obtain. An interested candidate for a genetic counseling program should check the specific program's website, as the requirements are rapidly updated as the discipline grows.

Many schools also responded to the open-ended question as to the qualities of the ideal applicant. This question was designed to explore the personal traits and skills that an applicant to a genetic counseling program should have in order to enter a genetic counseling training program. After review of the answers, categories of personality traits and skills were created based on the answers given. These categories include many answers that were given by more than one school. These categories include: introspective self-reflection, engaged learning style, communication skills, critical thinking, and being goal oriented. These traits and skills were listed as attributes an applicant for a genetic counseling program should be able to demonstrate in order to enter a training program.

Introspective self-reflection is an activity that every candidate should go through. This allows a candidate to figure out who they are, become more mature, and to decide if this is the right path for them. These were issues that the schools were very concerned with. Knowing who you are is important because genetic counselors deal with heavily emotional issues due to the nature of some genetic illnesses. The stress that these emotional issues can bring be difficult to handle. Maturity is also very important in this career path. This is also due to the emotional issues that a genetic counselor has to deal with. A person who is not emotionally and mentally mature may not be able to handle it or may be insensitive to the clients' needs. This program often takes ten people or less per year. The programs want a potential applicant to be sure that genetic counseling is the definite path of choice. The programs want you to be sure and

dedicated to this career path so that they do not take a spot away from a deserving candidate and give it someone who may not even finish the program.

Programs also want people that have an engaged learning style. They want good academic credentials, but they also want someone that is motivated and enjoys learning. A genetic counselor learns something new every day. There are so many genetic diseases that there is no way to learn all of them in a class. Genetic counselors often have to look up a condition that a client is coming in for, and be able to relay that information in a way they can understand. This also involves having well-established communication skills. It is important that the genetic counselor be able to speak to all different types of people, be personable, conscientious, and empathetic to the client.

Critical thinking skills are also important for this career. In reading scientific journals and other information about genetic diseases, a genetic counselor has to be able to pick out the important information that needs to be relayed to the client. This must be gathered into a coherent set of information that can then be relayed to the client.

A potential candidate for a genetic counseling program must be goal-oriented. It is important that an applicant know what they want so they can have the motivation to succeed in a genetic counseling program and as a genetic counselor.

Discussion

Genetic counseling as a career is the wave of the future in genetics, as it combines clinical genetics with the ability to help a client cope with whatever diagnosis comes about. In order to do this, a genetic counselor must have the background, skills, and knowledge that allow them to accomplish this. This requires that potential applicants to a genetic counseling program take certain undergraduate classes, as well as other requirements, that allow them to enter an

ABGC certified program. Being in an ABGC program will in turn allow the applicant to be accredited by the ABGC, which is required to practice (ABGC.net). These requirements (classes such as biochemistry, genetics, and statistics; good GRE scores; 3.0 GPA; etc) give a comprehensive background that allows a potential genetic counselor to succeed. Doing well in school is not enough though; a genetic counselor has to have the personal traits and skills to succeed. The information gathered from this questionnaire provides a good basis to start the path toward becoming a genetic counselor, but individual requirements should always be checked with the school of interest. This career is growing quickly, and the programs in order to enter are changing with the growth.

Any person interested in becoming a genetic counselor should make sure that it is definitely the field for them. These programs are very small and the most sure and qualified applicant should be allowed the opportunity to enter. Attempting to enter a program can be frustrating because there are not many spots open per year, but this assures that the quality remains high in the field. Do not be discouraged if you do not get in to a program the first time you apply. It may be a blessing in disguise that allows you to explore your options and become more prepared for your future career in genetic counseling.

Using the information gathered in this study, an example pamphlet was prepared for the use of Ball State University³. This pamphlet can be reworked by any school to provide an informational packet that students can use as a resource to prepare for a genetic counseling training program. It lists basic information such as: what a genetic counselor does and what path to take as an undergraduate in order to prepare for application to an accredited program.

³ Appendix C

Appendix A

PREREQUISITE REQUIREMENTS FOR GENETIC COUNSELING GRADUATE PROGRAMS

Please indicate if the following classes or activities are required or recommended for entry into the genetic counseling program at your institution.

Prerequisites	Required	Recommended	Not Needed	Semesters Recommended
Classes				
General Chemistry				
Organic Chemistry				
Physical Chemistry				
Biochemistry				
General Biology				
General Genetics				
Human Genetics				
Molecular Biology				
Microbiology				
Physics				
Developmental Psychology				
Counseling Psychology				
Other Classes Not Listed				
Activities (Where Appropriate, List Time Recommended)				
Advocacy/Volunteer Work				
Genetic Counseling Internship				
Job Shadowing				
Counseling Experience				
Other				
Other Requirements				
Major Requirements				
Minimum GPA (please indicate scale)				
Other Requirements Not Listed				
Additional Comments:				

PREREQUISITE REQUIREMENTS FOR GENETIC COUNSELING GRADUATE PROGRAMS

WRITTEN DESCRIPTION OF "IDEAL" APPLICANT

(Please include a written description of any personal attributes an applicant should possess). Responses should be hand written.

Most schools made a bulleted list of comments, but many of them wrote very specific paragraphs about the types of students they were looking for. These comments included

- Maturity
- Dedication
- Motivation
- Know who they are
- Engaged learning style
- Explored other options to make sure that this field is correct
- Experience and comfort with counseling

Several schools also expanded on the survey portion of the questionnaire to list undergraduate requirements more specifically.

X= required, r= recommended

Foreign Language	Philosophy	Medical Ethics	Ethics	Human Development	Public Health	Maternal/Child Health	Anthropology	Sociology	Neuroscience	Embryology	Behavioral Science	Calculus	Abnormal Psychology	Research Methods	Anatomy and Physiology	Statistics	Counseling Psychology	Developmental Psychology	Psychology	Physics	Microbiology	Molecular Biology	Human Genetics	General Genetics	General Biology	Biochemistry	Organic Chemistry	General Chemistry	
																x				x				x		x	x	Arcadia	
										R			r					r	x			r	r	x	x	x	x	Arkansas	
			R	r	r	r	r	r	r			r				x		One Psych Class			r			r	x	x	x	Boston	
														x		x	r	r	x	x		r		x	x	x	x	Brandeis	
										r					r	x	r		r						x			British Columbia	
																x	One class from this area or sociology or special education							x		x	California State, Stanislaus		
														x				x	x	x	r	r	r	x	x			Case Western	
																		r					r	r	r	r	r	Cincinnati	
															x	x				X			r	r	x	x	x	Colorado	
																	r	r			x		x	x	x	x	x	Howard	
																r	1 class required					1 biology and 1 genetics course required			r	x	x	IUPUI	
																r								x				Johns Hopkins	
																x	r	r			r	r	r	x	x	r	r	Maryland	
																x	2 courses					x		x	x			McGill	
																x							x	x	x	x	x	Michigan	

	Foreign Language	Philosophy	Medical Ethics	Statistics	Human Development	Public Health	Maternal/Child Health	Anthropology	Sociology	Neuroscience	Embryology	Behavioral Science	Calculus	Abnormal Psychology	Research Methods	Anatomy and Physiology	Statistics	Counseling Psychology	Developmental Psychology	Psychology	Physics	Microbiology	Molecular Biology	Human Genetics	General Genetics	General Biology	Biochemistry	Organic Chemistry	General Chemistry	
									X								X				X			X	X		X			Minnesota
																	X			X				X	X	X				Mt. Sinai
																r		r	r			r		r	X		X	X		North Carolina
																	X		X	X	X		X	X	X	X	X	X		Northwestern
																			r	r		r	r	r	X	X	X	X		Oklahoma
													X	X			X								X	X	X	X		Pittsburgh
	r	r	r								X			r		r	X	X					X		X	X	r	X		Sarah Lawrence
																	X								X	X	X			South Carolina
																														Stanford
																	r	X- either/or			r			r	X	X	X	X		Texas
											X						X				X		X		X	X	r			Toronto
	r																r				r		r		r		r			University of California, Irvine
																	X				X				X	X	X	X		Utah
													X	X				r	r	r		r	r	r	X	X	X	X		Virginia Commonwealth
													X				X				X				X	X	X	X		Wayne State
													r				r								X	X				Wisconsin-Madison

*All schools recommend or require volunteer or working counseling experience. Internships and job shadowing of genetic counselors or clinical geneticists is also recommended. See the individual program websites for additional information. Links to the websites can be found at abgc.net. California State University at Northridge had no requirements listed on their website and are not accepting students in the 2008 school year due to budget cuts.

Requirements for Entering Genetic Counseling Programs

In order to enter a genetic counseling training program, there are certain requirements that you must fulfill.

Major:

- Most schools have no major requirements, but biological and psychological sciences are recommended

Classes:

- Chemistry
 - General
 - Organic
- Biochemistry
- Biology
- Genetics
 - General, Advanced, Human, Molecular
- Psychology
 - General, Developmental, Counseling
- Statistics and Research Methods

These classes provide an overview of the class requirements in order to be prepared for this program. Individual class requirements should be checked on the program website.

Other Requirements:

- GRE- 50th percentile or above on all sections
- GPA- 3.0 minimum on 4.0 scale
- Volunteer and Advocacy work
- Job shadowing or internships with a genetic counselor or clinical geneticist

Ideal Applicant:

- Engaged learning style
- Good communication skills
- Has gone through self-reflective process
- Dedicated
- Critical thinking skills
- Goal oriented



Genetic Counseling: Prerequisites for Entry

This pamphlet was prepared for the use of the biology department at Ball State University

Created in part of fulfillment of the requirements of the honors thesis



Picture taken from BSU website
<<http://www.bsu.edu/directory/buildings/default.asp?buildingcode=CN>>

What is a Genetic Counselor?

A genetic counselor is a health care professional that provides a valuable service to individuals and families that are in need. Genetic counselors provide information and resources for those that are at risk for, have been tested for, or may be carriers for a genetic disease. They can also provide testing services in certain instances.

Genetic counselors often work as part of a comprehensive team in medical centers, and especially academic hospitals. This allows for more in depth care and greater services. Genetic counselors are also able to refer to specialists and support groups that can help the patient deal with the diagnosis.

Becoming a Genetic Counselor

To become a genetic counselor, you must attend a genetic counseling training program that is accredited by the American Board of Genetic Counselors (ABGC).

The ABGC is a wonderful source of information, including a complete list of programs in the United States and Canada. It also shows all the requirements for individual accreditation, which is necessary to practice genetic counseling in the United States. (www.abgc.net)

Another source of information is the National Society of Genetic Counselors (NSGC). Many genetic counselors are a part of this organization, but it is not required in order to practice. (www.nsgc.org)

Why Genetic Counseling?

Most people who become genetic counselors express a need to help people. Genetic counseling is a very rewarding field for people who feel this way.

Another reason that one might choose this as a profession is the short amount of time it takes to complete these programs. Most genetic counseling programs are two year comprehensive programs. It is a good alternative to those that wish to enter the medical field but do not want to spend years in medical school.

Genetic counseling does not provide the glory or money of other medical fields, but saves lives just the same.

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